

REMARKS

The Non-Final Office Action mailed January 4, 2007, has been carefully reviewed and these remarks are responsive thereto. Claims 1-14 and 27-31 are currently pending in this application. Claim 2 has been cancelled and new claim 32 has been added. Thus, claims 1, 3-14, and 27-32 are at issue. Reconsideration and allowance of the instant application are respectfully requested in view of the remarks presented in this response.

Claim Rejection Under 35 U.S.C. §102

Rejections Over Butcher

Claims 1, 2, 5-6, and 27-31 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,814,029 to Butcher (“Butcher”). Applicants traverse this rejection in light of the amendments to claim 1.

Claim 1 includes, among other elements, “mechanically processing the one or more filaments to arrange the one or more filaments in a predetermined orientation to provide a green body by depositing the filaments onto a working surface in one or more layers.” Butcher does not disclose this element of claim 1. Butcher, rather, discloses forming a multi-channeled body from a single extruded strand. More specifically, Butcher discloses several possible manners to produce a ceramic body:

- (1) Extruding a single core composite strand and firing the strand to produce a single channel ceramic body (See Col. 4, Lns. 42-46);
- (2) Re-packing a number of single core strands into an extrusion barrel and re-extruding to form a multi-core strand, which is fired to create a “honeycomb” ceramic body (See Col. 4, Lns. 47-60; Col. 5, Lns. 39-47; FIG. 4); or
- (3) Re-packing a number of multi-core strands into the extrusion barrel and re-extruding to form a strand with an even larger number of cores (See Col. 5, Lns. 54-64).

Nowhere does Butcher disclose arranging the filaments to form a green body to be fired. Applicants urge the Examiner to pay close attention to the language of the paragraphs at Col. 4, Lns. 42-46 and Col. 5, Lns. 39-47 and 48-53, which speak only of firing a single extruded strand to produce a composite body. Likewise, FIG. 6 does not depict a green ceramic body, but rather,

depicts a plurality of multi-core strands packed within a barrel (B) for re-extrusion. (See Col. 5, Lns. 54-64). Even if the Examiner should consider re-packing the strands into the extrusion barrel to be arranging the filaments in a predetermined orientation to provide a green body to be fired, Butcher does not disclose depositing the filaments onto a working surface in one or more layers. Again, Butcher only discloses producing a ceramic body from a single extruded strand, and does not teach arranging the strands together to form a green body to be fired. As stated above, FIG. 6, relied upon by the Examiner, merely discloses re-packing the strands into the extrusion barrel for re-extrusion. Accordingly, Butcher does not disclose all the elements of claim 1, and Butcher cannot anticipate claim 1.

Furthermore, Butcher does not disclose a heat exchanger. Even if the Examiner considers the language, “to provide a heat exchanger” to be merely an intended use, Applicants submit that claim 1 recites, “A method of manufacturing a heat exchanger comprising ...” Thus, a method which does not produce a heat exchanger cannot anticipate claim 1.

For the reasons set forth above with respect to claim 1, Butcher also cannot anticipate dependent claims 5-6 and 27-31.

Rejections Over Musso

Claims 1-2, 5-6 and 27-31 stand rejected under 35 U.S.C. §102(e) for being unpatentable over Musso et al., U.S. Publication No. 2003/0173720 (“Musso”). Applicants traverse this rejection in light of the amendments to claim 1.

As stated in Applicants’ response to the previous Office Action, Musso does not disclose simultaneously extruding the first and second compositions, as recited in claim 1. Musso, in contrast, discloses forming a body around core members by initially placing the core members in a fixture in a first step and then subsequently filling the spaces around the core members with a matrix forming material in a second step. Musso fails to teach a process in which both the core and body materials can be arranged in a single step to form the intermediate structure. Applicants request the Examiner to more thoroughly explain the statement, “the already extruded first composition are indeed being simultaneously co-extruded again along with second composition.” Applicants submit that Musso discloses a die casting / infiltration and other mold techniques, which do not fit under any possible definition of the word “extruding.” Further, the

Examiner has pointed to no teaching in Musso of the second (i.e. matrix) material being extruded. The passage in paragraph [0209] cited by the Examiner discloses only the extrusion of the core members. Paragraphs [0060] and [0061], cited by the Examiner, merely disclose that extrusion is a liquid state method, and do not describe how to perform such extrusion, or enable one skilled in the art to do so. Accordingly, Musso does not disclose this element of claim 1, and cannot anticipate claim 1.

Further, Musso does not disclose “mechanically processing the one or more filaments to arrange the one or more filaments in a predetermined orientation to provide a green body by depositing the filaments onto a working surface in one or more layers.” Musso does not disclose arranging two-component extruded filaments into a body, and also does not disclose the deposition of such filaments onto a working surface. Again, Musso discloses arranging core members in a mold and filling the mold with a matrix material. No two-component filaments are produced using this method, because the method produces an entire body. Thus, Musso also does not disclose this step of claim 1, and cannot anticipate claim 1.

For the reasons set forth above with respect to claim 1, Musso also cannot anticipate dependent claims 5-6 and 27-31.

Claim Rejections Under 35 U.S.C. §103

Rejections over Musso and Butcher

Claims 1, 2, 5-6, and 27-31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Musso in view of Butcher. Applicants traverse this rejection in light of the amendments to claim 1.

As described above, neither Musso nor Butcher discloses, teaches, or suggests “mechanically processing the one or more filaments to arrange the one or more filaments in a predetermined orientation to provide a green body.” Musso discloses placing core members in a mold, filling the mold with a matrix material, and then removing the core members to create the channeled composite. This method does not incorporate the use of two-component filaments, nor does it involve arranging or otherwise processing such two-component filaments. Butcher discloses extruding and re-extruding a series of cored strands to produce multi-channeled

strands, which strands are fired alone to create a multi-channeled body. Butcher never teaches the arrangement of these filaments to form a green body, and thus, the bodies produced by the method of Butcher may be limited in size and/or shape.. In contrast, the claimed method provides for constructing ceramic bodies of varied size and shape.

Additionally, even if the Examiner considers one of the cited references to disclose arranging the filaments as discussed above, neither Musso nor Butcher discloses, teaches, or suggests forming the green body “by depositing the filaments onto a working surface in one or more layers.” Musso does not disclose any arrangement, deposition, or other manipulation of two-component filaments, because the mold techniques disclosed by Musso do not produce such filaments. Butcher does not disclose the use of any working surface or the deposition of filaments onto a working surface to form a green body. As stated above, Butcher teaches that the bodies to be fired are extruded into the desired shapes before firing. Accordingly, neither of the cited references discloses these elements of claim 1, and no *prima facie* case of obviousness has been established with respect to claim 1.

Further, Butcher and Musso are not properly combinable or modifiable as proposed by the Examiner to form an obviousness rejection, for several reasons. First, the disclosure of Musso cannot be modified to include the arrangement or deposition of filaments to form a green body, because the mold methods of Musso do not incorporate any use of two-component filaments. For this same reason, the methods disclosed in Musso are not compatible with the extrusion methods described in Butcher. Thus, one skilled in the art would not be motivated to modify the teachings of Musso, or to combine said teachings with those of Butcher, as proposed by the Examiner. Second, Butcher teaches away from arranging the cored strands to form a green body, as recited in claim 1. Butcher is directed toward controlling the features of the final body by manipulating the characteristics of the extrusion process. For example, Butcher discloses that the size and concentration of the cores can be controlled by re-extrusion, through manipulation of the number of re-extrusions, the degree of diameter reduction, and the proportions of components. (See, e.g., Col. 7, Lns. 15-21). Thus, one skilled in the art, upon reading Butcher, would not be motivated to produce a multi-channeled product by arranging two-component filaments into a desired shape. Accordingly, no *prima facie* case of obviousness has been established with respect to claim 1.

For the reasons set forth above with respect to claim 1, no *prima facie* case of obviousness has been established with respect to dependent claims 5-6 and 27-31.

Other Rejections

Claim 3 stands rejected under 35 U.S.C. §103(a) for being unpatentable over Musso et al., in view of Butcher and Hoopman et al., U.S. Patent No. 5,317,805 (“Hoopman et al.”). Claim 4 stands rejected under 35 U.S.C. §103(a) for being unpatentable over Musso et al., in view of Butcher and Hoopman as applied to claim 3 and further in view of Davenport, U.S. Patent No. 3,222,144 (“Davenport”). Claim 7 stands rejected under 35 U.S.C. §103(a) for being unpatentable over Musso et al., in view of Butcher and Hanaki et al., U.S. Patent No. 4,746,479 (“Hanaki et al.”). Claims 8-10 stand rejected under 35 U.S.C. §103(a) for being unpatentable over Musso et al., in view of Butcher and Avakian, Publication No. US 2004/0106713 (“Avakian”). Claims 8 and 9 alternatively stand rejected under 35 U.S.C. §103(a) for being unpatentable over Musso et al., in view of Butcher and Ocher et al., Publication No. US 2003/0131476 (“Ocher et al.”). Claims 11 and 12 stand rejected under 35 U.S.C. §103(a) for being unpatentable over Musso et al., in view of Butcher and Rainer et al., U.S. Patent No. 5,533,258 (“Rainer et al.”). Claim 13 stands rejected under 35 U.S.C. §103(a) for being unpatentable over Musso et al., in view of Butcher and Rossi, Publication No. US 2002/0037142 (“Rossi”). Claim 14 stands rejected under 35 U.S.C. §103(a) for being unpatentable over Musso et al., in view of Butcher and McCullough, U.S. Patent No. 6,093,961 (“McCullough”).

As discussed above in connection with independent claim 1, Musso and Butcher fail to disclose, teach or suggest a method for manufacturing a heat exchanger by arranging two-component filaments to provide the structure of the heat exchanger, by depositing the filaments on a working surface. Rejected claims 3, 4, 7-14 depend from claim 1. None of Hoopman et al., Davenport, Hanaki et al., Avakian, Ocher et al., Rainer et al., Rossi, and McCullough disclose, teach, or suggest the method of manufacture as claimed and do not provide any teachings to cure the deficiencies of Musso and Butcher. Indeed, the Examiner does not point to any teaching of the above-discussed elements in any of Hoopman et al., Davenport, Hanaki et al., Avakian, Ocher et al., Rainer et al., Rossi, or McCullough. Accordingly, none of the cited references, either alone or in combination, disclose, teach or suggest the invention of claims 3, 4, 7-14, and

no prima facie case of obviousness has been established with respect to claims 3, 4, 7-14. Consequently, withdrawal of these rejections under 35 U.S.C. §103(a) are respectfully requested.

New Claim

New claim 32 is patentable over the cited references for the reasons stated above. Additionally, claim 32 is patentable over the cited references because Butcher does not disclose the production of a heat exchanger using the disclosed method. Even if the Examiner maintains that Butcher discloses a heat exchanger, Butcher does not disclose connecting one or more manifolds to the disclosed ceramic body. Thus, for this additional reason, new claim 32 is allowable, and Applicants respectfully request notice of the same.

CONCLUSION

In view of the above amendments and remarks, prompt reconsideration and full allowance of the claims pending in the subject application are respectfully requested. All rejections have been addressed and no new matter has been added. Applicants also request examination and allowance of new claim 32. Applicants respectfully submit that the instant application is in condition for allowance and respectfully solicit prompt notification of the same.

The Commissioner is authorized to debit or credit Deposit Account No. 19-0733 for any fees due in connection with the filing of this response.

If the Examiner has any questions, the Examiner is invited to contact the undersigned at the number set forth below.

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Respectfully submitted,

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